Bob Cooper's

SAT FACTS

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A monthly report on satellite positioning, programming, transmission formats and equipment of interest to retailers, installers, system planners and dish users in the Pacific Ocean Region (POR). Mailed fast post on or about 15th; 12 issues NZ$40 within New Zealand, US$40 elsewhere except in Australia through exclusive agent AV-COMM PTY LTD, PO Box 225, Balgowlah NSW 21093 (tel: (61) -2 -949 -7417; FAX (61) -2 -949 -7095.

CNN SAYS "YES" TO SPACE!

Turner International Australia Pty. Ltd. formally notified SPACE Pacific of a decision to launch an analogue Pacific Ocean Region service on PanAmSat PAS-2 on the 14th of December. Actual analogue "tests" on transponder 10H had begun on the 10th of December and were first reported by **Bryon Evans** of Pacific Antennas (Whangaparoa, NZ). This is considered a major victory for the trade association SPACE Pacific and a significant "building block" for the growth of SMATV, CATV and DTH system growth in the Pacific using PAS-2 signals.

Turner's **Greg Ell** (14 December) notification to SPACE:

"CNNI is now on PanAmSat-2 in the clear. We will be running tests over the next few weeks to get the signal as good as we can from a technical view. This will be on NTSC delivery.
(Then) *we will scramble early in 1995 with the final decision yet to be made on the encryption to be used. It will not, however, be in the format originally considered which would have required a decoder costing US$17,500."*

Turner's analogue CNNI feed is "sandwiched in" on transponder 10 with CDV feeds. TR10 is 54 MHz wide (see SF No. 3, p.6) and the needs of the CDV service channels take priority over the analogue NTSC feed. Testing since the 10th of December has sought to find the optimum analogue bandwidth for CNNI while still preserving the transponder spectrum space required for the compressed digital video. A second consideration will be the amount of power, as a percentage of the total transmission power available, which can be used for the analogue feed. Tests underway since the 10th have been varying the relative percentages of total power available between the CDV service channels and the analogue service channel.

Pacific Antenna's Bryon Evans immediately began conducting his own tests with various size dishes between 1.8 and 5m to determine how small a dish could be used for the CNN feed on TR10. SatFACTS

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reader **Danny Deng** of Auckland, who is opening a satellite system retail business to serve the North Island Chinese community with Chinese Television Network and other programming, found the pictures barely acceptable on his 1.8m test dish. Evans confirmed this but also found that if the installer carefully selects his receiver and properly installs a linear polarisation feed, "acceptable pictures" are possible with a 1.8m size dish. Evans believes the correct installation size for (New Zealand) users who will want CNNI (on subscription) will be in the 2.4 to 2.8m range. For Australia, see What Dish Size?, below.

Here are the reasons behind these recommendations:

a) CNNI's analogue signal is sharing a 54 MHz wide transponder with considerable MCPC (digital) data. It is likely to end up in a 20 MHz (wide) bandwidth. The receiver, to optimise CNNI in this semi-hostile environment, will require adjustable bandwidth tuning (to optimise to the actual bandwidth or a tad less).

b) On the opposite polarity (transponder 9V) is the Prime Sports analogue signal. Evans found and SatFACTS confirms that some of what appears to be "sparklies" in the picture is actually a combination of cross-pole signal from the PRIME Sports transponder and the CDV data on TR10H. The correct installation hardware will include a feedhorn with linear (not circular) switchable polarisation.

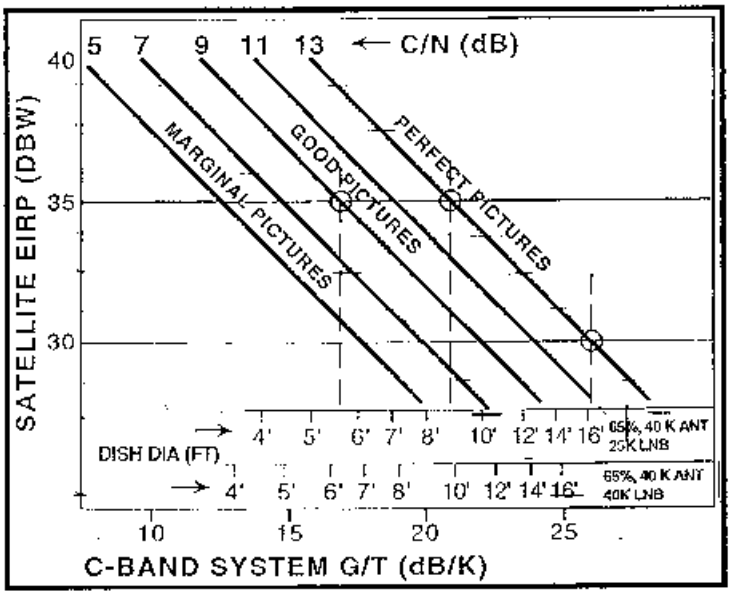
c) Subject to confirmation from Turner, it is likely the final "power level" for CNNI in analogue will be reduced by 3 to 4 dB from a comparative signal such as CMT. Therefore those 1.8m dishes that were producing "noise free" pictures on CMT will find they need just a bit more antenna gain for CNNI; thus the 2.4 to 1.8m dish size suggestion.

For a discussion of the CNNI analogue service pricing, and the method of obtaining CNNI on subscription, see SPACE Notes in this issue.

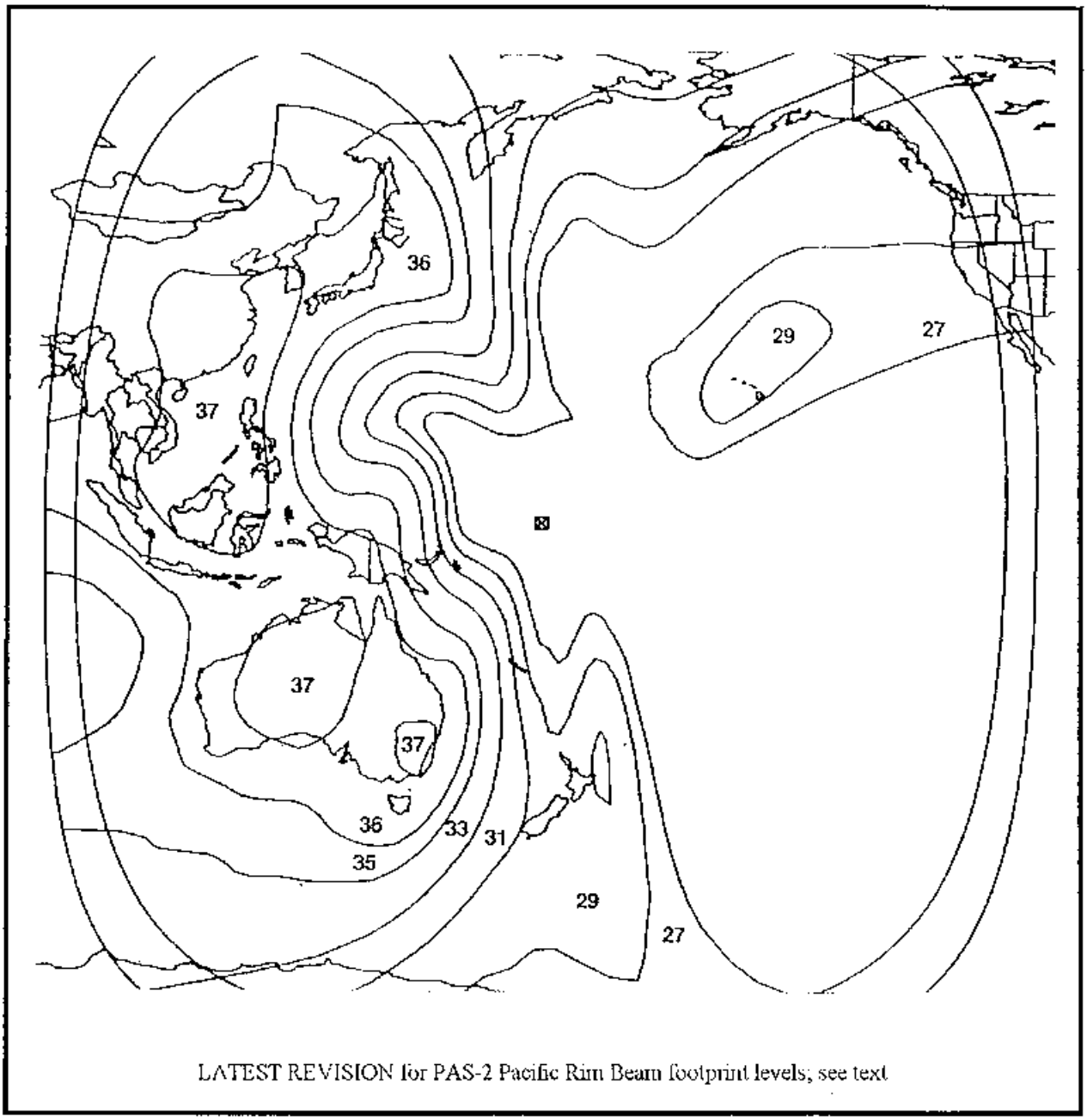
WHAT SIZE DISH FOR PAS-2?

Several dozen SatFACTS readers in New Zealand and Australia have reported "perfect pictures", especially on CMT (TR7V), CTN (15V) and ANBC (13V), with dishes in the 1.8m size range. Many of these reporters only had access to circular polarisation (Intelsat) feeds at the time of their observations; improvement in performance can be expected with proper linear polarisation feeds.

The coverage ("footprint") map on the following page requires some explanation. Satellite designers predict their coverage based upon what they believe they know about the satellite's transmitting antenna performance prior to satellite launch time. Following the launch, satellite operators will modify their pre-launch "footprint" coverage maps with updates. The map on page 3 is the most recent PAS-2 map available.



To have a threshold quality picture with a 1.8m dish and a typically 27 MHz bandwidth requires a "footprint" of at least 34 dBw; the kind of level which AsiaSat 2 will place into eastern Australia by late August. The PAS-2 level into portions of the eastern Australian coastal area (Sydney) is 37 dBw; the chart (left) says that threshold pictures are likely on dishes as small as 1.2 metres. In New Zealand, the footprint map (page 3) suggests the eirp dBw signal level is 29 dBw (except in East Cape where they claim 30 dBw). Real-world results tell us the actual signal levels in the Auckland region (for



LATEST REVISION for PAS-2 Pacific Rim Beam footprint levels; see text

example; others as far south as Timaru report similar results) are more likely to be in the 34 dBw region. PanAmSat has no explanation for this; watch and enjoy with smaller dishes!

Transponder "loading", how each programmer "loads" up the transponder (or portion of a transponder using MCPC digital) will have a direct bearing on your results with varying dish sizes. Ideally, all transponders would arrive at your desired location with the same signal level. This is not an ideal world and there will be variations of as much as 4 dB between the weakest and the strongest. This says you design the receive system for the weakest, and that in turn leads Bryon Evans and others to the 2.6m (8.5 feet) "compromise" size for New Zealand. In Australia's eastern coastal areas a 1.8m (5.9 feet) would appear to be a suitable compromise size although certainly 1.2m will supply high quality pictures on the stronger transponders. To report your own observations, especially outside of Australia and New Zealand, see "January Reporting Form" on page 20 of this issue.

UPDATE - T11E POR Satellite Month

As reported in SF No. 4 Intelsat 180 is now occupied by the 511 satellite after a move from 177E. We asked readers throughout the POR to use our December "Report Form" to share their observations. Most observers reported no apparent changes in I511 service from predecessor I508 and that is as it should be. There was a pattern, however, with many Australian viewers telling us the vidiplex signals on TR9 (3,876 MHz) were down in level from I508. Several New Zealanders reported Worldnet (TR14 3,975 MHz) down a dB or more. More recently, Australia 9 (TR22/4,135) has been using both LHC and RHC for a pair of separate video signals (this will cause major problems to users with linear feeds!).

Gorizont-Rimsat 130E: The RAJ-TV operating schedule now begins around 1200 UTC (TR1 3,675) although during the Christmas holidays the channel ran expanded hours including several very recent American movies. More importantly, a new Manila (Philippines) test card (ABC-5 Manila) has been seen testing on TR3+ (3,780) T. Schroder (Qld., Australia) was first to report the channel (27 December) noting it is "*only slightly weaker than RAJ-TV and near threshold even on a 1.8m dish.*" The programme audio observed has been English (!) so this one will bear watching although no New Zealanders have reported this one. Shane Wilson (Mareeba, Qld) also reports RAJ TV and ABC Manila plus Sun-TV (R1+ 3,725), Asia Net (R9 3,820), Udaya TV (R10 3,924). Ricky Dizon at Kampana Television Corporation (Manila) advises the 130E bird is a "*standard Gorizont launched in November 1993 with 6 C band and 1 Ku band transponder on board.*"

Gorizont 142.5E: The distinctive "envelope" of MCPC (compressed digital video) is reported by observer Dunnett (New Zealand) on approximately 3,825 MHz. Ricky Dizon of AllAsia ViaSatv Manila has told SF "*We plan up to ten channels in CDV but there is no CDV yet there.*" Dunnett's spectrum analyser suggests otherwise. Dizon also advises "*Hindi movies are coming to 142.5*" but no start date has been announced (see SF No. 3, p.5)

PanAmSat PAS-2 169E: Discovery in PAL B-MAC appeared on TR4 (3,875 MHz) December 23; within New Zealand, SKY Network is the programming rep (John Fellet 09-579-9999) but prices have not been announced. Chinese Television Network stopped free to air analogue at midnight December 31st TR15 but continues transmitting in S/A CDV on TR1; programming subscription from Bernard Cheung (Hong Kong) FAX 852-2505-7430. Additional details in March 15 SF. CNNI appeared in free to air analogue 10 December TR10 3,966 MHz; details pages 1 and 13 this issue. Country Music Television was to begin running CDV in parallel to their free to air analogue signal December 24 and is scheduled to cease their free to air feed 15 January. Subscription details are expected shortly through SPACE Pacific.

Intelsat 177/180: BBC News and CBS Evening News, previously I180E, now at 1100 and 1130 UTC weekdays I177E TR23 RHC in free to air analogue. Canal Plus, 24 hour French movie and feature service distributed in Europe, North America on subscription scheduled on I177E or 180E this month in Thomson CDV format. Service will be downlinked to New Caledonia and redistributed on UHF in encrypted format similar to SKY Network (NZ) at US$60 per month (!).

SERVICES NOW AVAILABLE TO HOME VIEWERS / MOTELS IN POR

INDIAN: RAJ-TV (130E), Asia Television Network (142.5E) all 3m dish size.
RUSSIAN: Moscow "1" (103E, 145E) 3.7m dish size.
MANDARIN: Zhong Tian in S/A CDV, PAS-2, 2 - 4m.

FRENCH: RFO (TR18) I180; Canal + (shortly) in Thomson CDV.
JAPANESE: NHK Nightly News (only), 0900 UTC, I180.
GERMAN: Deutche Welle 1900 UTC daily, I180.

ENGLISH: CNNI 24 hours (I180, PAS-2); Prime Sports (0530-1030 UTC) PAS-2; ANBC (1500-2400 UTC) PAS-2; BBC News I177; ABC Manila on 130E; various US feeds I180; ABS-CBN PAS-2.

DIGICIPHER MPEG 1.5 TESTS BEGIN FOR AUSTRALIS ON OPTUS B1

No Official Word - yet

Optus refuses to verify that Digicipher compressed digital video MCPC (multiple channel per carrier) signals that began appearing on horizontal transponders 10 and 11 the week prior to Christmas are for Australis, the satellite delivery pay television company. However, SatFACTS did obtain a form of verification by reporting to Australis reception of the signals and this elicited a response of "*You are kidding - in New Zealand?*".

We have also verified the test signals are originating at the Belrose (NSW: 33.44S, 151.13E) uplink facility. The last official word from Australis concerning their own "Galaxy Service" pay television service said the uplinking would be done from a new (February scheduled start-up) Adelaide region facility. However, in the Australian media a spokesperson for "Galaxy" has suggested that limited testing of a sports channel could begin at any time.

Transponders 10H and 11H are opposite in polarity to the more common ABC/SBS/occasional news feeds found on transponders 5 and 7 of B1. This means those with present reception will need to switch their feed horn (LNB) feed probe 90 degrees (quarter turn) to peak up on the horizontal polarised signals.

	A3/156E	B1/160E
TR1V/data		<.9m
TR5V	>3m	<1.0m
TR7V	>3m	>3m
TR10/11 H		1.2m likely

OPTUS into NEW ZEALAND
Based upon daily measurements conducted Dec/Jan.

The good news at this point is the signal levels on 10 and 11H; as shown on page 18 in this issue. For reference, the occasional news feeds on Optus B1 TR5L are strong enough using the south-east Australia beam that above threshold reception is possible in New Zealand with antennas in the 90cm class. On the opposite end of the spectrum, Aussat/Optus A3 services (TRs 5L, 7L) and B1 services from ABC and SBS are at or below threshold even on high efficiency 3m range dishes and the best electronics. Spectrum analyser measurements of the Optus TR10 and 11 feeds were begun by Kiwi observers almost from the day the MCPC signals first appeared. On average, the signal levels are approximately 7 dB stronger than the ABC and SBS feeds, and only a couple of dB weaker than the "hot" transponder 5L "occasional feeds". We compile that here for you.

Digicipher 1.5 is an interim CDV format from General Instruments and is in (American format) NTSC. Australis has been criticised in the Australian media for selecting an NTSC format but with Digicipher 2 transmit and receiver hardware (which will function in PAL) scheduled for world-wide deployment in the second half of 1995, Australis/Galaxy is likely to upgrade by the end of 1995. Anyone using the initial 1.5 format service will be faced with NTSC to PAL format conversion after the satellite signal is received. SatFACTS is currently testing a Digicipher 1.5 format model 1500 receiver using the C band PAS-2 transmissions of (Philippines) ABS/CBN and we will have a report in our February issue. Australis / Galaxy tests on TR11H are typically NTSC colour bars with 5 "video channels" turned on (0,1,2,5 and 6). A 3m+ Auckland dish measured 13 dB C/NR on both TR10 and 11 MCPC carriers from Australis. For Australis/Galaxy marketing FAX 61-2-325-7444. For GI units inside of New Zealand, Maser Technology Group (Auckland) 64-9-479-6536 (Ken Clark).

PanAmSat's Ku Dilemma

A Great Bird, Great Coverage
and No POR Customers!

The POR May "Lose" This One

PanAmSat PAS-2 was designed to provide both C and Ku band service, simultaneously, with up to 36 separate (analogue bandwidth) programme channels on each band. On C band, there are two separate transmit antenna "patterns" available; the Pacific Rim Beam (PRB) and the Oceana Beam (OB). Only three of the 16 C band transponders have Oceana Beam capability, all 16 C band transponders have PRB capability. To date only the PRB has been used by users.

The design antenna transmit patterns on Ku band are more versatile:

1) Northeast Asia Downlink Beam (NEAB): Boresighted on Korea and Taiwan (50 dBw), antennas as small as 0.5m are practical in these areas with slight larger antennas for Japan and most of eastern China. There are four transponders available on this beam.

2) China Downlink Beam (CB): Boresighted on the central Chinese coast (Amoy) at 52 dBw, this translates to 0.4m dishes with dishes in the up-to 0.5m class for virtually all of China and Taiwan (including Hong Kong). There are between 5 and 8 separate full transponders available on this beam.

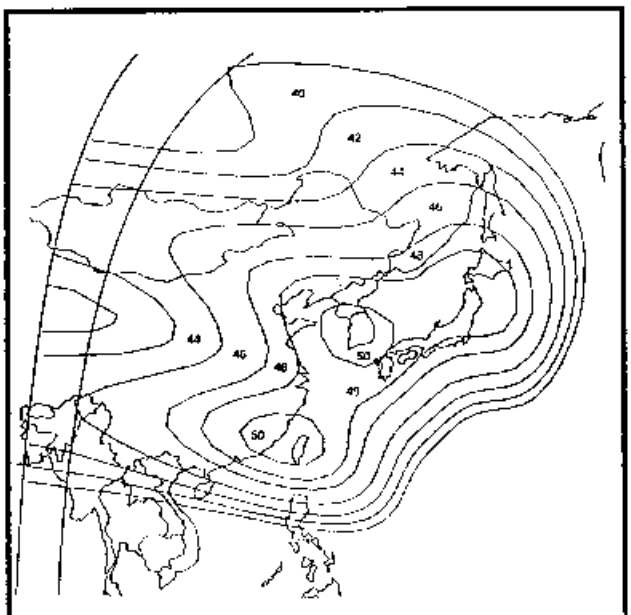
3) Australia / New Zealand Downlink Beam (ANZB): Boresighted on North Island (New Zealand) as well as the Australian states of Victoria, South Australia, New South Wales, Queensland (Brisbane south) and south-western Australia at 45 to 46 dBw, this translates to 1m size dishes. There are from 4 to 7 transponders on this antenna service.

PanAmSat has built into PAS-2 the ability to switch the boresight antenna patterns on some transponders (see page 2, this issue). As a minimum., the NEAB will always have four dedicated transponders. However, on the CB and ANZB there are switching capabilities such that Australia and New Zealand could end up with access to as many as 7 full transponders, or, as few as 4; the difference switching to the China Beam if that is where the business activity develops.

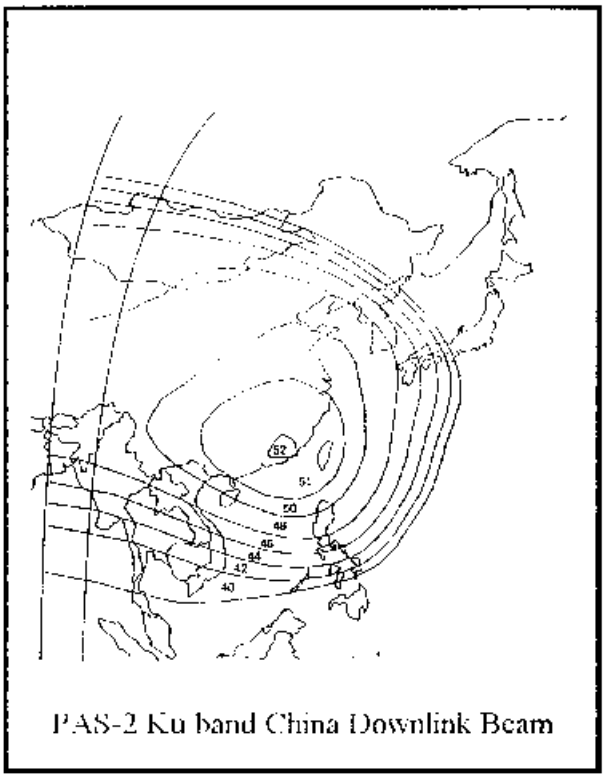
Under Australian "rules" pay television programming may presently be delivered to any of the following categories via either C band or Ku band encrypted service:

a) Hotels, b) Banks, c) Government departments, d) Private businesses

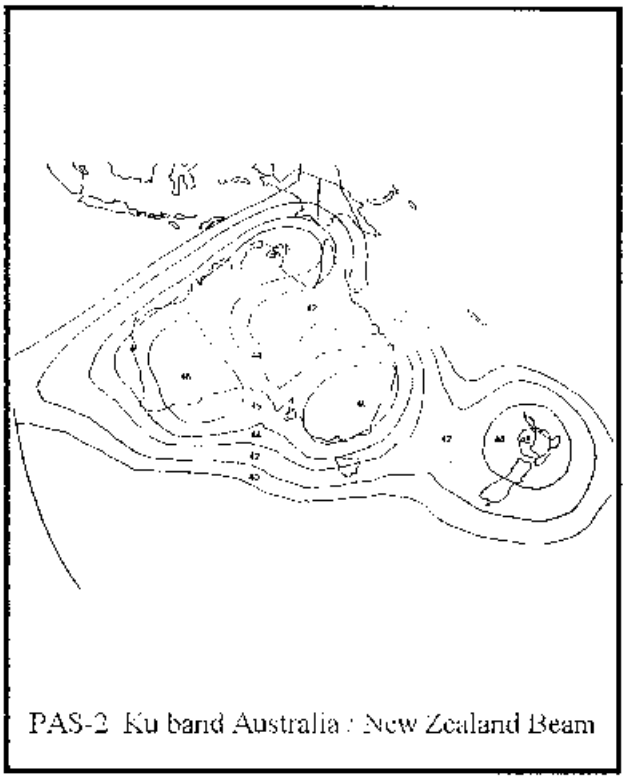
Pay television (defined as any service for which a fee must be paid for routine access) cannot be delivered via satellite to a private residence unless the pay television is transmitted to the private residence via an Australian (domestic) satellite. Many businesses already "subscribe" to CNNI, for example, taking either a direct satellite feed from 1180 or connected via the Ozpac Optic cable (out



PAS-2 Northeast Asia Ku Downlink Beam



PAS-2 Ku band China Downlink Beam



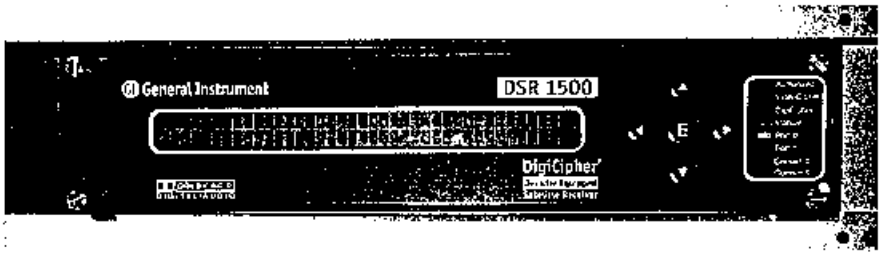
PAS-2 Ku band Australia / New Zealand Beam

of Melbourne). Hotels presently pay in the range of A$2.50 per room per month for this service in motel and hotel environments; or A$30 per year (per room).

The primary usefulness for PAS-2 in the Australia (and New Zealand) marketplace would be for the delivery of "pay television" to customers. In almost any intelligent business plan, DTH (direct to home) service is included. However, at least through 1996 (under present rules) DTH service from PAS-2, because it is not an Australian domestic satellite, is forbidden.

A number of programmers are presently negotiating with PanAmSat for the rights to bring pay television services into the Asian (China) region. And what is likely to happen if Australia sticks to its present prohibition against DTH from PAS-2 is that 3 of the 7 potential transponders now available for service on the ANZB will be purchased by Asian / Chinese interests. When this happens, PanAmSat will be forced to push a button that directs these transponders away from ANZB and into Asia proper. At that point Australia and New Zealand have lost access to a valuable resource; moderately high power Ku band transponders capable of serving DTH and other dishes down to at least the 1m dish size level.

The clock is running and the odds are building each day that by 1996, when Australia may allow use of PAS-2 for DTH into Australian homes, that 43% of the presently available Ku band transponder space will have gone, permanently, to Asian interests. PanAmSat has consistently attempted to point this factor out to Australian authorities who today stand firm in their ban of use of PAS-2 for DTH power level services. Alas, by 1996 when the present rules may change, it could be too late.



THIS GI Digicipher 1 CDV receiver is now being tested by SatFACTS: A report in February!

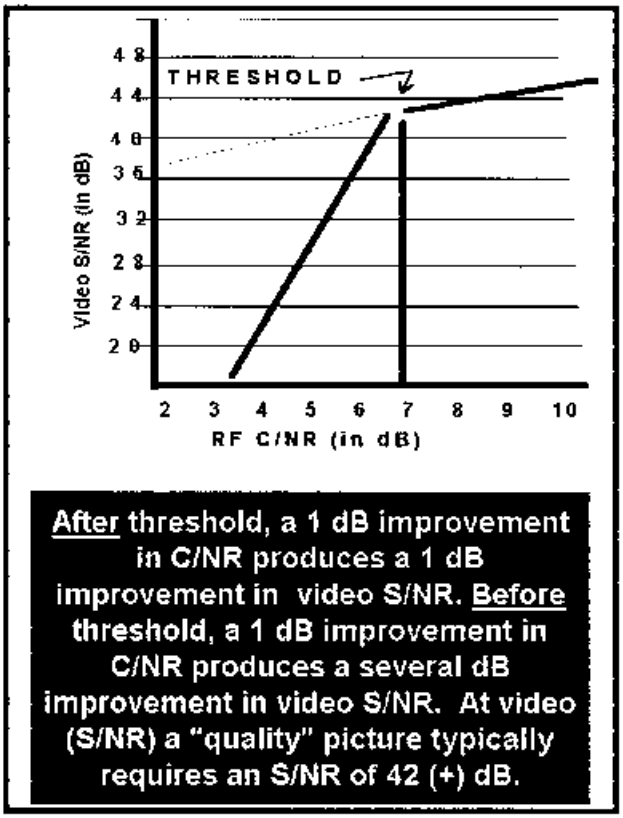
THRESHOLD EXTENSION

DOES IT REALLY WORK?

(Part Two of Three)

IN REVIEW

Analogue format satellite receivers have an "FM threshold," defined as the satellite signal level required to override internal (receive system created) and external (galactic and manmade) "noise." In the satellite equation, noise is bad, signal is good. LNBs are rated by their "noise factor" with C band LNBs generally in the 25 to 40 degree K(elvin) temperature range, Ku band LNBs in the 1 dB noise figure range. Kelvin and noise figure are interchangeable LNB "rating" systems. In both cases, the noise factor of the LNB is a major factor in determining the "threshold" for the receiving system. In both C and Ku systems, the lower the noise factor of the LNB, the better the system performance and the "lower" the threshold.



After threshold, a 1 dB improvement in C/NR produces a 1 dB improvement in video S/NR. Before threshold, a 1 dB improvement in C/NR produces a several dB improvement in video S/NR. At video (S/NR) a "quality" picture typically requires an S/NR of 42 (+) dB.

Perfect pictures occur when the available satellite signal is strong enough to override any system noise. This generally occurs when the receive system satellite signal level is in the 7 to 9 dB signal level region, reference the system noise level. In professional circles this is called the 'C/NR' for Carrier to Noise Ratio: increments of carrier (signal) greater than the system noise. A C/NR of 7, 8 or 9 dB usually produces pictures that are at least equal to the threshold of the receiver. The threshold of a receive system is traditionally "static," known (or computed) in advance. When a dish and LNB combination produce pictures that are "below threshold" (i.e., pictures with noise degradation), you can improve the pictures by increasing the dish size (producing more signal: the "C" in C/NR) or by decreasing the system noise (a better LNB with a lower "noise factor": the "N" in C/NR.

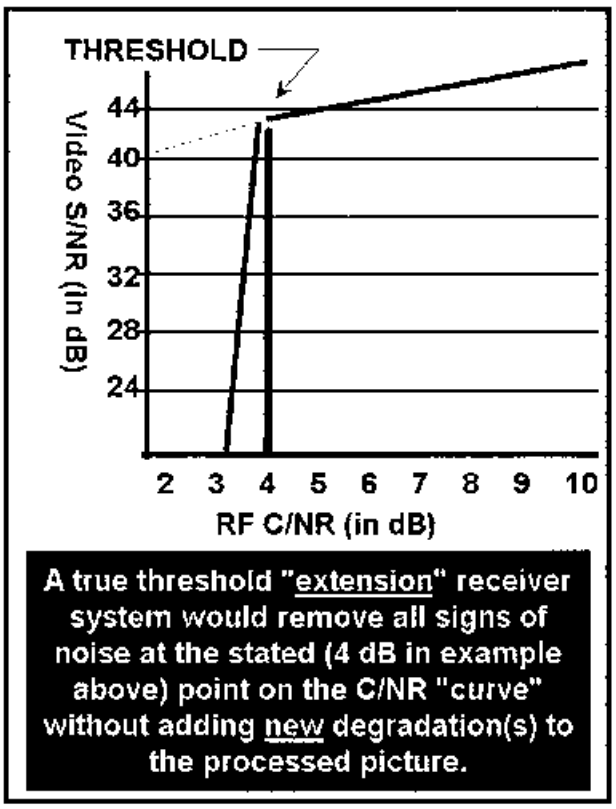
As the chart here shows, the picture quality (S/NR along left hand side) varies rapidly as the C/NR improves from 1 dB to the threshold point (7 dB in chart). Once the signal level achieves "threshold" everything changes; from that point onward a 1 dB improvement in C/NR also produces a 1 dB improvement in S/NR. Logic suggests that if you reduce the threshold point, you can get better pictures "sooner" with less actual C/NR. This is the premise behind "threshold

extension;" by extending the threshold downward to a lower C/NR point, you achieve better system performance. Alas, saying it is one thing; achieving it quite another.

Threshold extension systems seek to reduce the level of signal (C in C/NR) required to create a noise-free picture. In SF No. 4 we reviewed how a receiver that narrows the bandwidth can improve the C/NR but only by adding new (fidelity-limiting) forms of degradation in the process. The most desirable form of threshold extension eliminates noise ("sparklies" or snow in the picture) without adding new forms of degradation.

To really extend (reduce or lower) the threshold, a receiver would create a new threshold point further down the curve; say at 4 dB C/NR. And it would, at that threshold point, produce the same quality picture you now have with a "standard receiver" at the 7, 8, or 9 dB C/NR point. Such a receiver would have a threshold "curve" such as that show here. This is basically the curve for a "standard" receiver, shown on page 8, but reduced to create a threshold point of 4 dB C/NR rather than at 7 dB C/NR.

"Without degradation" is a major limiting factor for threshold extension because none of the receivers which claim "threshold extension" actually lower the threshold below the nominal 7 dB point. Rather, they attempt to create a picture with fewer "sparklies" (noise bits) by either narrowing the receiver bandwidth (which produces multiple forms of undesirable degradation including tearing of the video on saturated bright colours), or, using digital techniques to identify noise bits. Once the noise bits are identified, and removed from the image, the "holes left" by removing the noise (removing the noise or sparklies also removes the picture bits hidden behind the noise) are digitally filled with "similar" picture bits from another portion of the image. Thus a digital processor recreates missing picture parts by identifying and replicating similar picture bits in portions of the image that were not destroyed by noise. This is all very clever, but is it really threshold extension? The answer is no.



A true threshold "extension" receiver system would remove all signs of noise at the stated (4 dB in example above) point on the C/NR "curve" without adding new degradation(s) to the processed picture.

Attacking The Noise

To really reduce the threshold from 7 to 4 dB requires violating a law of physics or two. As detailed in SF No. 4, every bandwidth has "noise" inside. And the wider the bandwidth, the greater the amount of noise. It is this "law" which receivers that allow the user to narrow up the bandwidth take advantage of; reducing the bandwidth reduces the noise. Of course it will also reduce the amount of signal present as well, as explained in SF No. 4.

The amount of noise within the chosen bandwidth is partially a function of the receiver system electronics. Lowering the LNB noise temperature improves things by reducing one source of noise. Careful design of the receiver's IF gain section and filters (the filters determine the width of the signal processed) can also improve (by reducing) the noise contribution from the receiver. The

portion of the receiver that magically changes the "RF" (radio frequency) signal to a "video" signal, the demodulator, is another place to improve on the performance by reducing the noise contribution. But when all of these receiver areas are peaked for top performance, there is still noise left within the bandwidth; noise that is present whether signal is there or not. This noise can be minimised; it cannot be totally eliminated. There are practical design limits where the very best LNB, the best receiver IF design, the best receiver demodulator design are as good as they are going to get. This occurs with a 27 MHz bandwidth at around 7 dB C/NR. Better than that requires more than engineering skill; it demands that you change the laws of physics relating to noise in a given bandwidth. Nobody has figured out how to do that; yet.

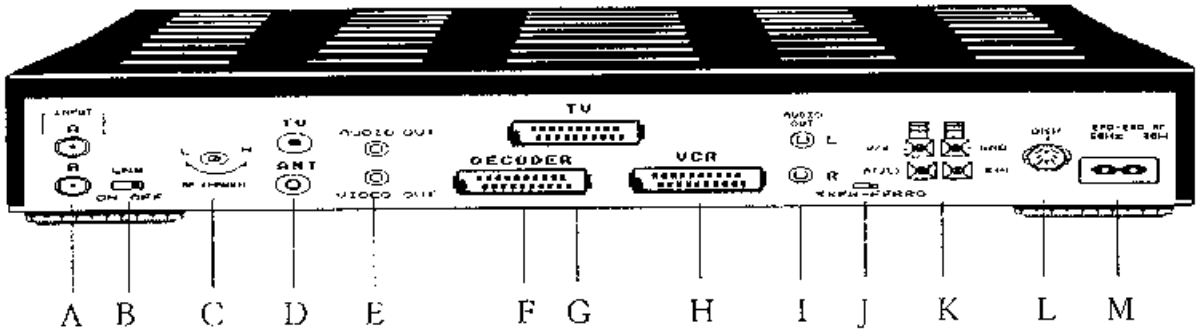
The Cherokee Receiver

This receiver has a pair of IF inputs; you could use one for C, one for Ku or both on a single band. The receiver coverage range is extra-wide (950 - 2050) which means the receiver will handle the new Palapa C and AsiaSat 2 series of "expanded C band" satellites; if either have analogue video programming available. Every function of the receiver is accessed through the IR remote control; misplace it and you cannot even turn the unit on!

Of particular interest to this report is its claim of a TED (threshold extension) tuner. Like many receivers the Cherokee has more than a single IF (tuner) bandwidth. The standard (they call it wide) bandwidth is 27 MHz, which suits most of the European Ku band services. However, it adds a remote selectable 18 MHz bandwidth as well and when the receiver is switched to this "narrow" position the advantages of their TED system are apparent.

As the twin photos (next page) clearly show (subject as always to the failure of printed reproductions to accurately highlight the detail), the same screen image in "Narrow bandwidth" versus "Wide bandwidth" is favourable to the TED position. This image, from Worldnet on I180, has the Cherokee's on-screen graphics in place (you can switch them off on IR command) and the noise in the picture is doing unsavoury things to the graphics as well in the "wide" position.

What the photos do not show is a comparison to a non-TED-claimed receiver. We evaluate all receivers against a commonly available (Winnersat 3600 PLL) receiver. This is a straight forward

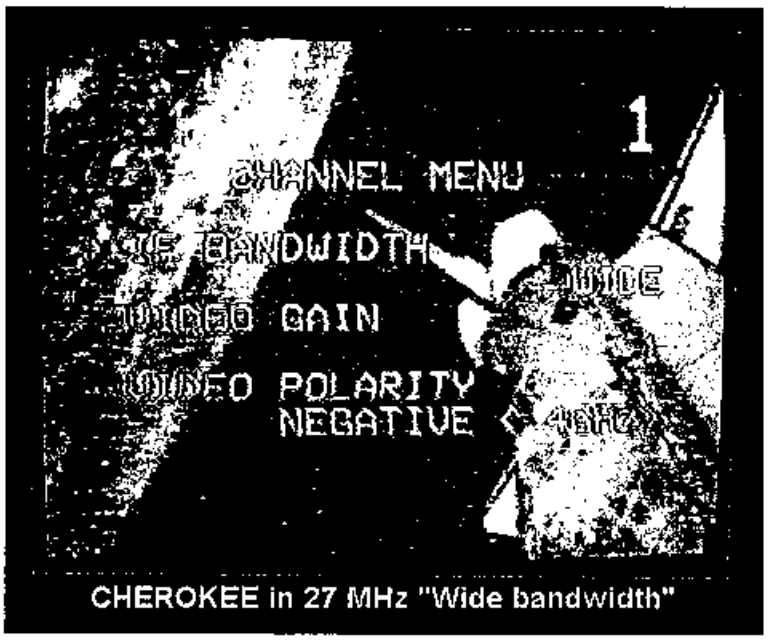


CHEROKEE: A = Twin IF inputs; B = LNB powering, on or off; C = UHF RF modulator output channel adjustment; D = TV (set) output + V/UHF antenna input; E = baseband video, audio outputs; F = SCART plug, decoder loop; G = SCART plug, TV out; H = SCART, VCR loop; I = Stereo audio (L + R) outputs; J = Polarizer format selection switch; K = Polarizer V/H control wire connection; L = interface to optional dish mover; M = AC power

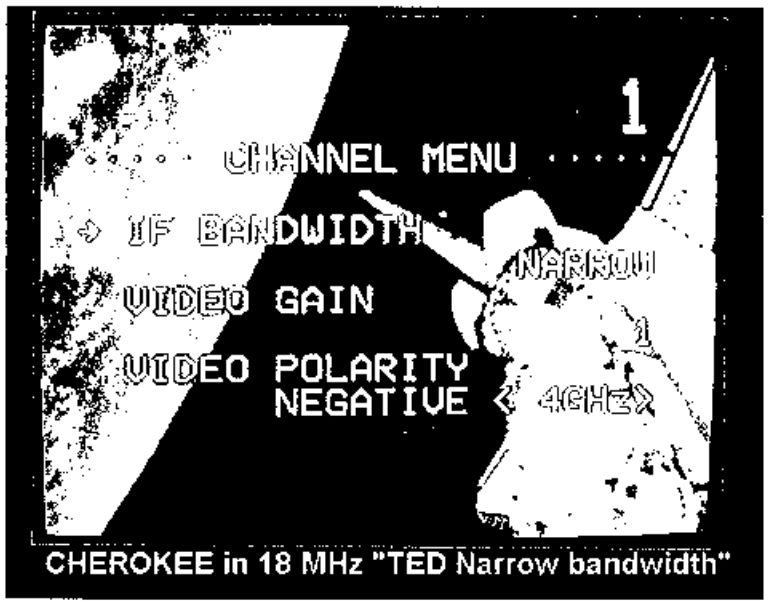
knobs on the front analogue receiver with good performance, including a "bandwidth control" knob that allows the user to vary the bandwidth continuously between 32 and 8 MHz.

We found that by merely varying the bandwidth of the Winnersat we could duplicate the same picture quality as the Cherokee, which strongly suggests the Cherokee's TED performance is basically a novel way of relabeling IF bandwidth control. The quite excellent manual claims:

Threshold Level:
<7 dB C/N in 27 MHz wide position
<4.0 dB C/N in narrow position



CHEROKEE in 27 MHz "Wide bandwidth"



CHEROKEE in 18 MHz "TED Narrow bandwidth"

For someone saddled with a fixed IF bandwidth receiver that accepts only the 950 - 1450 MHz input range the modern circuitry of the Cherokee and its considerable versatility would be an attractive candidate for upgrading. In the "TED" position the picture quality is good although saturated colours will "tear" on the screen when you are viewing signals that still have sparklie noise even with the TED engaged. At the real threshold (with or without TED, certainly not <4.0 dB) the images are sharp, and the colour is excellent. The Cherokee is available in the POR through AV-COMM Pty Ltd, PO Box 225, Balgowlah NSW 2093 at A$910 plus applicable taxes.

<u>If This Is NOT Threshold Extension -</u>

... what is? Actually reducing the threshold to some number smaller than 7, 8 or 9 dB for a 27 MHz wide satellite transmission is highly improbable. But some clever Europeans have discovered digital ways of processing the analogue signal to "simulate" a lowered threshold by identifying noise bits, eliminating these noise bits, and then refilling the "holes left" by the noise removal with regenerated picture bits. Done properly, pictures with sometimes greatly reduced noise and no undesirable "processing artefacts" are now possible. But, if analogue video is to be replaced with compressed digital video transmission, is it too late to matter?

Next month in part three we'll see how this works.

3
BASIC MANUALS

When the first home satellite TV revolution swept through North America in the early 1980s, Bob Cooper wrote and published more than two dozen self-help manuals to assist new comers to the field with the practical world of building, installing and operating a "TVRO" (television receive-only terminal).

These manuals have now been reprinted and are available exclusively here through SatFACTS.

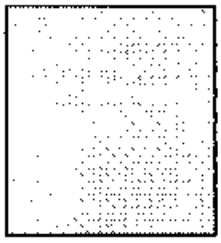
Each manual is self-contained, complete to itself and its chosen subject matter. Each manual spotlights a separate, distinct aspect of the home satellite TV system world.

Not a word has been changed form the original manuals; be warned that as the technology has developed, some aspects of home terminals described are no longer as then-described (for example: Can you imagine having to install **7/8ths inch hardline** cable from the antenna feed to an **indoor** LNB!)
The material here is, however, timeless and will not be found in print elsewhere. It is intensely practical, down to earth, for a very space-age subject.

PRICE:
Any single manual is NZ$30 (*)
Any two manuals - NZ$50 (*)
All three - NZS70 (*)

TO ORDER:
Appropriate payment in NZ$ or equivalent to:
ROBERT B. COOPER, PO Box 330, Mangonui, Far North, New Zealand
***/ Sorry, Not available in Australia.**

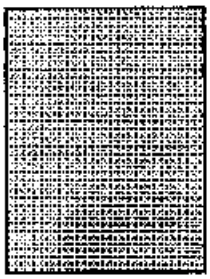
COOP'S SATELLITE OPERATIONS MANUAL



The Keep-It-By-Your-Receiver Guide to where to tune, for what, how to spot TVRO/ARO problems, how to make the new terminal function best.

PRICE: $30 per copy

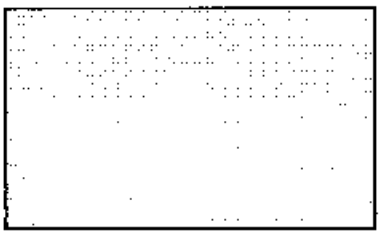
THE GIBSON SATELLITE NAVIGATOR MANUAL



How your TVRO antenna system must be designed so that your system will be able to access the full Clarke orbit belt.

PRICE: $30 per copy

COOP'S BASIC MANUAL ON FINE TUNING PRIVATE SATELLITE TERMINALS

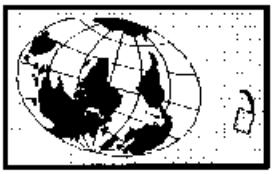


THE BASICS. The nitty-gritty world of properly preparing and installing coaxial connectors, tweeking receivers, finding the focal point with an antenna feed and much more.

SPACE NOTES

A technical and marketing advisory memo to the membership from your industry trade association group

SPACE Pacific
Satellite
Programme
Access
Committ**E**e



CNNI 'VICTORY': A Battle Won, Not The War

A FAX from Turner International addressed to private satellite dish dealer Jean Claude Kryger (Ham Troninque, Noumea) dated 13 September started it all:

"PAS-2 has been launched. CNNI will be active from November 1 with a digitally compressed signal. That's the good news. The bad news is that the digital decoder cost of US$17,000.00. Naturally not many hotels will be interested in spending that kind of money."

SPACE Pacific immediately accepted this challenge. As we reported in SatFACTS No. 2 (p.1) and No. 3 (p.6), CNNI was not only going to a very unique (not private dish terminal compatible) CDV format, but it was also scheduling dropping of the Intelsat 180 analogue feed around 1 March (1995). This seemed to be the end of the trail for CNNI in the POR after nearly 5 years of service.

SPACE began to query this decision going to Turner executives in Hong Kong, Sydney, London and Atlanta. We also encouraged users of CNNI from Intelsat 180 to contact the same Turner offices (SF No. 3, p.19) to voice their concern over this loss. Meanwhile, in New Zealand CNNI terrestrial affiliate SKY Network was sending their sales people into the street to tell possible motel users of CNNI the service would only be available through SKY and a NZ$40,000 decoder would be required (SF No. 4, p. 13). While these untruths were being spread by the SKY personnel SPACE was lobbying heads of state throughout the Pacific to voice their "official disapproval" of the loss of CNNI. Simultaneously, influential satellite industry leaders were also lobbying Turner to correct this "oversight." One told SPACE Pacific:

> *"Actually, CNN overlooked the Pacific Ocean Region with their planned use of PAS-2. It was not a deliberate plan to cut-off the POR; it just happened because somebody forgot to check on how this region would receive signals capable of serving smaller dishes when they were planning the CDV use of their PAS-2 transponder. SPACE Pacific made them realise a mistake had been made. It is just that simple."*

Almost that simple. Within New Zealand, terrestrial pay service SKY saw in this "mistake" an opportunity to strengthen their monopoly of the Kiwi pay TV marketplace. They encouraged CNN to overlook the POR because the entry level cost of US$17,000 for custom CDV decoders would ensure SKY's exclusive use of CNNI. SKY wanted the "exclusive rights" to CNNI within New Zealand, but was not willing to pay the asking price CNNI demanded. The high cost of the custom decoder accomplished their objective and they figured this would give them the exclusivity they desired without

SPACE: A PROGRESS REPORT

The SPACE Pacific formation committee has been working since September to fashion from 'scratch' a trade association to assist and represent private (TVRO) dish users. Along the way the committee has been active to encourage PAS-2 programmers to make their services available in the POR for reasonable pricing using responsible forms of encryption. The non-profit 'trade association' should be legally functioning by the end of March and at that time "provisional members" of SPACE, all subscribers to SatFACTS, will be encouraged to formally join the trade association at the appropriate membership level.

having to pay higher rates for CNNI's exclusivity themselves. SKY, of course, was totally unconcerned about what this commercially selfish attitude would do to CNN viewers in 22 other Pacific nations.

"*Turner has done the responsible thing*" suggests Kiwi TVRO pioneer Tony Dunnett. "*Viewers all over the Pacific should applaud this decision at CNN.*"

Getting CNN to reconfigure (at some dollar cost plus a loss in flexibility) their 54 MHz PAS-2 transponder to "squeeze in" an analogue feed (see this issue, p.1) is a victory but it is hardly the end of "the war." There remains, for now, several unanswered questions:

1) By contract, within New Zealand SKY is the organisation authorised by Turner to "sell" CNN. Outside of New Zealand (American Samoa, Australia .... through to Wallis & Futuna, W. Samoa) Turner has yet to decide where CNN subscribers will "go" to sign up for the service. While this detail is being sorted, SatFACTS readers who reside in any area other than New Zealand are being asked to write, phone or FAX Turner International as follows:

Write: Greg Ell, Turner International, PO Box 1808, North Sydney NSW 2059, Australia

Telephone: Greg Ell at 61-2-900-3111

FAX: Greg Ell at 61-2-957-5161

2) The actual format of analogue encryption is not announced; several are under review at Turner. They would like to adopt a technique that is low in cost to implement at the receiver end. On Palapa they use the relatively expensive B-MAC system. SPACE was told December 30 a tentative decision in favour of the "Leitch" system had been made; US$1,500 range per decoder. What is Leitch? See ABC/NHK feed on TR16 of I1801. Greg Ell told SPACE "*It is not our intention or wish to restrict the business of dish and equipment installation companies.*"

3) The pricing for the service is not announced. SPACE discussed pricing with SKY's John Fellet first on the 16th of December; at that time he was unable to give costs as the final version of SKY's contract with Tuner had not arrived. Greg Ell of Turner had suggested to SPACE that our trade association might be authorised to act as a "subagent" of SKY for at least New Zealand subscribers. SPACE has received approval to act as a "non-exclusive agent" for Country Music Television, to our membership, and we seek similar agreements with others including CNN. SKY's Fellet claimed he had never considered allowing "subagents" previously but "would consider it." And that was December 16.

On 29 December Fellet and SPACE talked again. Fellet now believed there was no "benefit to SKY" if they "allowed SPACE to be a sub-licensing agent." He also advised that SKY was the "exclusive agent for Discovery in New Zealand" as well. If he would not agree to allow SPACE to be a "subagent" for CNNI (and Discovery) "*Would he allow SPACE to act as a representative to its members?*" we asked. He would consider that. He did feel that SKY would not be a "major source for decoder units" suggesting that SPACE members who are sellers of satellite hardware should do that function. In any event, SKY will not have a CNNI and Discovery pricing schedule worked out until "approximately 15 January." On December 30 CNNI advised SPACE "*The manner of launching encryption systems constantly changes.*" Obviously much remains to be sorted out in this situation and we'll update members further in the February 15th SatFACTS.

The Structuring of CNNI Charges

CNNI viewers served by Palapa B2P found CNNI scrambled (encrypted) on 15 December. To decode the service requires a Scientific-Atlanta B-MAC decoder (US$1,300) and dish owners were quoted US$50 per year, US$4.17 per month, $0.14 per day. By December 30, the rate climbed to US$250 for CNNI + TNT via Palapa. Subscribers deal with CNNI offices at Turner International in Sydney. In Australia, private home owners cannot legally subscribe to CNNI but motels/hotels can. The hotels pay around A$0.08 per day per hotel room (US$0.06). In New Zealand SKY offers CNNI as one of three UHF terrestrial channels at NZ$0.45 per day (US$0.27) to homes, US$0.17 for motels.

BREAKING INTO THE WORLD of SATELLITE TV

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This three-issue set of TECH BULLETIN is available only here through SatFACTS at a money-saving price of $40. You will learn all about the satellite system techniques and equip yourself to be in the satellite system business!
INCLUDED:

TB9402 / MATV: Master Antenna Systems. How to plan, select equipment for and install multiple outlet systems for motels, hotels, apartment flats and condos.

TB9404 / Home Satellite Systems. What the parts are, how they go together, what each does, and how you create a working system with maximum performance at a minimum outlay.

TB9405 / Commercial Satellite Dish Systems (SMATV). Whether you are building a system from scratch, or adding satellite received channels to an existing MATV distribution system, this will help you do it right!

THIS PACKAGE of three (3) self-help manuals is a hands-on course in the new world of satellite TV receiving systems. Individual copies of TECH BULLETIN are also available at NZ$20 each.

TO ORDER:
Appropriate payment in NZ$ or equivalent to
ROBERT B. COOPER, PO Box 330, Mangonui, Far North, New Zealand

ORBITAL ACTIVITY - PRESENT AND SCHEDULED (Current to January 1995)

(Shaded indicates change at orbital position)

Orbit Pos.	Satellite	Inc. Orbit	Polarity	Dec. 1994	Mid 1995	End 1995	Mid 1996	End 1996
87.5E			Linear V,H		Apstar 2	Apstar 2	Apstar 2	Apstar 2
100.5E			Linear V,H		AsiaSat 2	AsiaSat 2	AsiaSat 2	AsiaSat 2
102.7E	Ghorizont 25	+/- 0.2	RHC	Ghorizont 25	Ghorizont 25	Ghorizont 25	Ghorizont 25	Ghorizont 25
105.5E	AsiaSat 1		Linear V,H	AsiaSat 1	AsiaSat 1	AsiaSat 1	AsiaSat 1	?
107.7E	Palapa B2R		Linear V,H	Palapa B2R	Palapa B2R	Palapa B2R	Palapa B2R	Palapa B4
110.7E	ChinaSat 2		Linear V,H	ChinaSat 2	ChinaSat 2	ChinaSat 2	ChinaSat 2	ChinaSat 2
113.0E	Palapa B2P		Linear V,H	Palapa B2P	Palapa B2P	Palapa C1	Palapa C1	Palapa C2M
115.5E	ChinaSat 5		Linear V,H	ChinaSat 5	ChinaSat 5	China DFH 3D	China DFH 3D	China DFH 3D
118.1E	Palapa B4		Linear V,H	Palapa B4	Palapa B4	Palapa B4	Palapa B4	Palapa C1
128.0E			Linear V,H		JCSAT 3	JCSAT 3	JCSAT 3	JCSAT 3
130.0E	Rimsat	+/- 1.0	CP	Rimsat	Rimsat	Rimsat	Rimsat Express	Rimsat Express
131.8E	Japan CS3A		CP	CS3A	CS3A	CS3A	CS3A	CS3A
134.3E	Rimsat	+/- 3.6	CP	Rimsat	Rimsat	Rimsat Express	Rimsat Express	Rimsat Express
135.8E	Japan CS3B		CP	CS3B	CS3B	NTT-1	NTT-1	NTT-1
138.0E	Apstar 1		Linear V,H	Apstar 1	Apstar 1	Apstar 1	?	?
139.9E	Ghorizont 18	+/- 0.2	RHC	Ghorizont 18	Ghorizont 18	Express	Express	Express
142.5E	Rimsat (2)	+/- 0.2	CP	Rimsat (2)	Rimsat (2)	Rimsat (2)	Rimsat (2)	Rimsat (2)
145.0E	Ghorizont	+/- 1.0	CP	Ghorizont	Gorizont	Gorizont	Express 11	Express 11
154.0E								Palapa B2R
156.0E	Optus A3		Linear V,H	Optus A3	Optus A3	Optus A3	Optus A3	Optus A3
160.0E	Optus B1		Linear V,H	Optus B1	Optus B1	Optus B1	Optus B1	Optus B1
164.0E	Optus A2	+/- 1.3	Linear V,H	Optus A2	Optus A2	Optus B3	Optus B3	Optus B3
169.0E	PanAmSat PAS-2		Linear V,H	PAS-2	PAS-2	PAS-2	PAS-2	PAS-2
174.0E	Intelsat 701		CP, LP	I701	I701	I701	I701	I701
177.0E	Intelsat 703		CP,LP	I703	I703	I703	I703	I703
180.0E	Intelsat 511	+/- 2.0	CP,LP	I511	I511	I511	I511	I702
177.0E	Intelsat 510	+/- 2.2	CP,LP	I510	I510	I510	?	?

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Low Threshold Receiver

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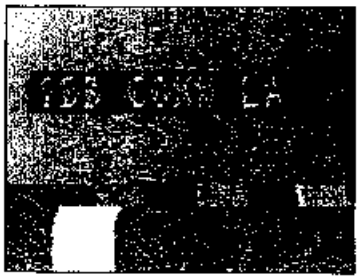
- TRIPLE SCART OUTPUTS
- HI FI STEREO SOUND
- SUPPORTS ALL POLARISERS
- DUAL IF BANDWIDTH
- 4 EVENT TIMER OVER 2 WEEKS
- OPTIONAL POSITIONER AVAILABLE

FROM THIS



TO THIS

Here's what "What Satellite" Magazine said:

This is because hidden inside this machine, with surprisingly little song and dance made about it, is a 3dB "low-threshold" tuner. This brings in the weaker signals with comparative ease, removing sparklies from pictures that other receivers would give up on.

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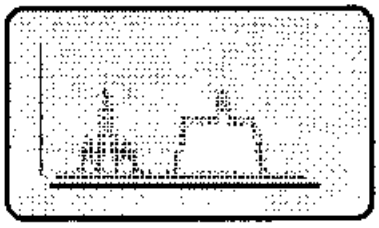
SELECTED SPECTRUM ANALYSER DISPLAYS



of current satellite activity as contributed by SatFACTS readers

What They Show

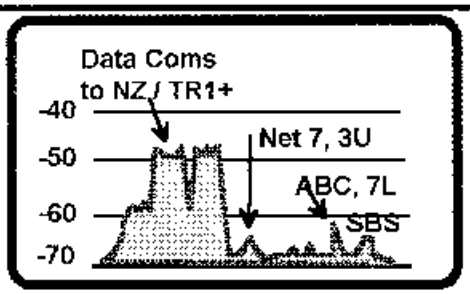
A spectrum analyser is a CRT (cathode ray tube - picture tube) display of signals. Unlike "analogue Signal Level meters," the spectrum display is adjustable to include the entire satellite band (i.e., such as 3,700 to 4,200 MHz), a portion of that band, a single transponder within the downlink band, or just a portion of a transponder (such as one carrier within a transponder). The spectrum analyser is calibrated to allow you to measure the strength of the signal (or parts of a single), the width (bandwidth) of a signal or a portion of a signal, and many will also analyse the modulation characteristics of a signal.

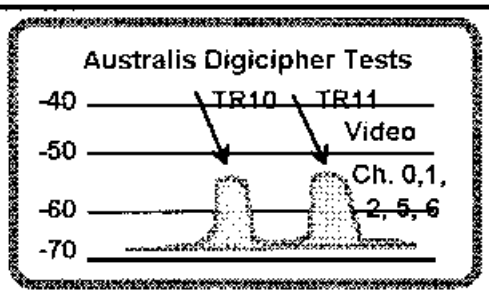
Compressed digital video signals are especially difficult to resolve (detect) with an analogue receiver, and even with a CDV receiver, if the signal has not been authorised for your particular receiver, the signal will go totally unnoticed by you. Fortunately, an analyser displays the presence of "signal power" without regard to the content of the programming which allows an installer to detect, observe and measure the characteristics of the signal even without demodulating the information.

Many SatFACTS readers are equipped with analysers, and they routinely report on what they observe. While ideally an observer would photograph a CRT display (using ASA100 film, set camera to 1/15th of a second and f stop to around 4.5), a simple tracing of a display with a piece of white paper and a pencil is almost as useful. Let us hear from you!

Optus Pay TV Tests:

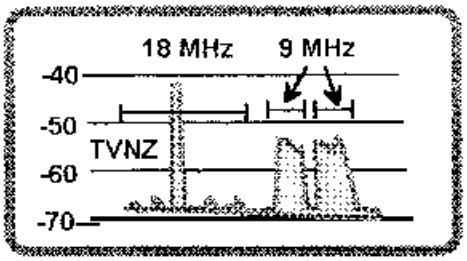
NZ receive dish 3m+; vertical scale - dBm. ABC and SBS, vertical, typically 14/15 dB weaker than data com channels (radio et al) fed to NZ TR1. On horizontal, GI NTSC format Digicipher 1.5 tests 5 to 6 dB weaker than data coms but 7 to 8 dB stronger than ABC/SBS; NZ pay TV potential!

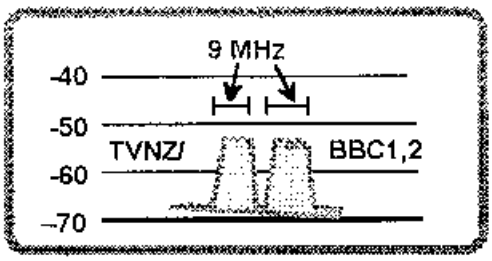




TVNZ BBC CDV FEED:

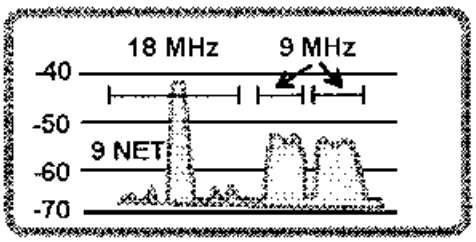
NZ receive dish 3m+; vertical scale same as above. Transponder 23, I180. Analogue signal (when in use; such as CBS feeds from USA) occupies 18 MHz, pair of NTL format CDV feeds occupy twin 9 MHz segments at levels as much as -10 dB reference analogue signal (courtesy T. Dunnett).

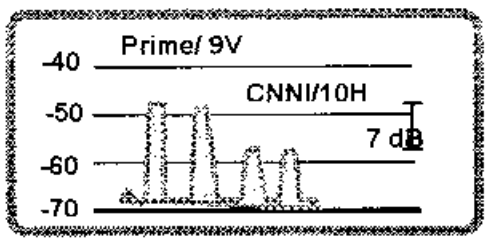




NET 9 (I180), CNNI PAS-2:

Melbourne 3m+ dish; left, Aust. NET 9 analogue and twin (BBC) CDV feeds TR 22 identical to TVNZ TR23 (above). Right, with linear feed parked halfway between Vt and Hz, CNNI PAS-2 analogue is down 7 dB from opposing polarity Prime Sports feed during mid December tests.





SatFACTS PACIFIC OCEAN ORBIT WATCH: 15 JANUARY 1995

Freq.	TR#	G/102.7	R/130.0	G/139.9	T/142.5	G/145.0	P169:Vt	P169:Hz	I174/177	I/180	Patrn
3,675	R6/-1	DublTV	RAJ TV		ATN	DublTV					
3,720	1									IDB	w/29
3,725	11	Muslim	SUN TV	DublTV	ATN	(tests)					
3,730	1 - 2						(MCPC)	CTN/**d**			
3,765	3									Vdp	w/28
3,777	R8		ABC-5								
3,790	3 - 4						PAS-2	Discov/b			
3,825	R9		ATN		Digital						
3,840	6									KDD	w/29
3,845	6A									CNNI	w/29
3,850	5 - 6						ESPN/b	(MCPC)			
3,876	9	JainTV				DublTV				Vdp	w/26
3,894	10									Vdp	w/26
3,915	7 - 8						CMT				
3,925	R10		Udaya								
3,930	12									Vdp	w/26
3,975	14									Wnt	w/29
3,980	9 - 10						Prime	CNNI			
4,015	16									NHK	w/25
4,040	11-12						Occ.vid.				
4,045	18									RFO	G/29
4,100	13-14						ANBC	ABS/**d**			
4,135	22									9/Oz	G/25
4,165	15-16							CBS/etal			
4,166	23								NwsFds	NZ/**d**	G/22
4,177	23A								(Afrts/b)		
4,188	24								NwsFds	TNZ	G/22

January 1995 Notes

/d indicates some form of digital; /b indicates B-MAC encryption. Prime (underlined) indicates totally or mostly unencrypted. Vdp indicates vidiplexed analogue. PAS-2, Optus are linear (vertical or horizontal); others right hand circular (RHC) except for AFRTS on 177E , A-9 1180E (LHC). PAS-2 feeds will continue to 'evolve' as full time CDV takes hold; see report page 2.

Ku BAND ACTIVITY UPDATE

RF Freq	TR#	IF
12,282	1(V)	977
12,532	5L(V)	1,193
12,558	5U(V)	1,218.8
12,661	7L(V)	1,344
12,688	7U(V)	1,370
12,376	10(H)	1,073
12,438	11(H)	1,137

Optus A3/ 156E	Optus B1/ 160E	PAS-2 Ku/169E
	TAB radio, data services	
ETV (afternoons)	Occasional feeds, News	
	Reserved; Occ. Feeds	
Japan NHK 12m-2AM NZT	ABC National	
	SBS (National)	
	Austral. D'cipher 1.5 NTSC	
	D'Cipher Ch. 0,1,2,5,6	

Ku band data courtesy Robin Colquhoun (64-9-630-7127), Francis Kosmalski (64-9-849-3512) and others. Optus A3 reception within New Zealand requires 3m range high efficiency size dish as does TR 7L and 7V from B1. 1.2M dish and smaller will produce quality signals from B1 TR5 and 10H, 11H. Digicipher MPEG 1.5 on B1 is in test mode.

SatFACTS JANUARY 1995 POR OBSERVER REPORTING FORM
(Please FAX [64-9-406-1083] or mail to arrive by 06 February)

TELL US what you are seeing that is new or changed within the past 30 days. Observer reports are an important part of the growing body of information we all share monthly in SatFACTS.

- NEW programming sources seen since 1 January: _____
- CHANGES in reception quality since 1 January: _____
- EQUIPMENT changes at my terminal since 1 January: _____

O WHICH of the following MIGHT you be interested in subscribing to if available at a REASONABLE annual rate?

☐ ANBC/ ☐ Australis/Galaxy (B1, Ku) ☐ Canal Plus/ ☐ CMT/ ☐ CNNI/ ☐ Discovery
☐ ESPN/ ☐ Prime Sports ☐ Zhong Tian (CTN "Timely Information")

Your Name: _____ Address _____
Town / City _____ Country _____
FAX/Telephone (optional) _____

Return to: **SatFACTS Observer, PO Box 330, Mangonui, Far North, New Zealand**
(FAX: 64-9-406-1083)

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